

PUBLIC SERVICE COMMISSION OF WISCONSIN

Memorandum

March 25, 2020

FOR COMMISSION AGENDA

TO: The Commission

FROM: Kristy Nieto, Administrator
Tara Pray, Deputy Administrator
Mitch Horrie, Evaluation Manager, Focus on Energy
Division of Digital Access, Consumer and Environmental Affairs

RE: Quadrennial Planning Process III 5-FE-101
Evaluation Work Group Recommendation to the Commission
of a Method for Calculating Avoided Capacity Costs and
Additional Avoided Cost Considerations

Suggested Minute: The Commission directed the Division of Digital Access, Consumer and Environmental Affairs to draft an order in accordance with its discussion.

This memorandum addresses three issues related to the evaluation of Focus on Energy (Focus) programs: (1) request to approve the Evaluation Work Group's (EWG) recommended methodology to calculate avoided capacity costs for the purposes of evaluating Focus; (2) request to approve the EWG's recommendation to review avoided costs annually; and (3) request to approve the EWG's recommendation to consider including a value for avoided transmission and distribution costs for the purposes of evaluating the benefits of Focus.

Background

Calculating the benefits of Focus requires an understanding of the costs that are avoided when energy consumption and demand are reduced. The approaches for developing and updating electricity and natural gas avoided costs of energy are well established in previous

Commission orders.¹ The approach for developing avoided capacity cost is not as clear. The most recent Commission order addressing avoided capacity costs for Focus Quadrennium III (Quad III), defined as the period 2019-2022 states, “For the purposes of evaluating Focus, avoided electric capacity costs shall be based on the unit costs of a peaker plant.” ([PSC REF#: 343909.](#))

The most recent update to avoided electric capacity costs occurred in 2015. In 2015, and in each previous update since 2010, avoided electric capacity costs were developed by Commission staff and presented to the Evaluation Contractor. However, due to staff changes at the Commission, the resources used for developing this value are no longer available.

During the Quad I Planning Process, the EWG was established to advise the Commission on Focus evaluation issues. The EWG consists of a Commission staff representative that serves as the chairperson of the Work Group, a representative from the Program Administrator, and Evaluation Contractor representative, a utility representative, and an industry expert representative. ([PSC REF#: 137129.](#)) Among the responsibilities of the EWG is to develop and recommend an appropriate method for valuing avoided energy costs. ([PSC REF#: 158228.](#))

Avoided capacity values are needed to evaluate Focus during Quad III and going forward. Therefore, the EWG has investigated alternatives for calculating avoided capacity costs to evaluate Focus. Cadmus, the Focus Evaluation Contractor, presented research, alternative approaches including a recommended approach, and resulting avoided capacity values to the EWG.

Cadmus conducted up front research on appropriate data sources and approaches prior to presenting alternatives to the EWG. The research of alternatives identified options that varied

¹ See: [PSC REF# 158228](#), [PSC REF#: 166932](#), [PSC REF#: 215245](#), [PSC REF#: 232431](#), and [PSC REF#: 343909](#).

with respect to data availability and transparency, consistency of results with avoided capacity values used in prior Quads, calculation complexity, regional specificity, the ability to capture the full cost of operating a new peaking resource, and time and effort to develop and update robust models. This effort was undertaken to rely on Cadmus' expertise in applying avoided capacity costs as a component of the overall evaluation of long-term demand reductions delivered through energy efficiency as well as to narrow the options presented to the EWG in consideration of their limited time and resources to evaluate available alternatives. Cadmus worked with Commission staff to narrow the alternatives presented to the EWG.

Cadmus presented the EWG with options that included: 1) continuing with the same method used for prior updates to the avoided capacity cost; 2) maintaining the current avoided capacity value; 3) an approach relying on the Midcontinent Independent System Operator (MISO) Narrow Constrained Area (NCA) Threshold Report data that captures the full cost of operating a new peaking resource; and 4) an approach that combines the MISO Cost of New Entry (CONE) with the aforementioned MISO NCA analyses. The EWG was presented with the advantages, disadvantages, and trade-offs associated with the alternative approaches. Additionally, the EWG was presented with, and given the opportunity to modify, the assumptions necessary to update the avoided capacity value under each alternative. The recommended approach was chosen in consideration of an appropriate balance of the following key criteria: transparency, continuity, cost, and flexibility. Further details on these considerations and the ability of the recommended approach to satisfy these criteria are discussed below.

The EWG found the recommended approach to be consistent with industry best practices, unanimously accepted the approach, and approved forwarding the recommendation to the

Commission for consideration. Although all members of the EWG participated in the review of the approach, the Program Administrator representative and the utility representative each recused themselves from voting on the recommendation in order to avoid any perceptions of conflict with their roles outside of the EWG. This memorandum presents the EWG's recommended approach for calculating avoided capacity costs including the step-by-step methodology, data sources, assumptions, and resulting values for Quad III.

As a component of the Evaluation Contract, a potential study is to be conducted in support of the upcoming Quadrennial Planning Process IV (Docket 5-FE-104). In addition to using avoided costs for calculating the benefits achieved by Focus for Quad III, these values are a critical input to the potential study. The EWG considered the computation of avoided capacity in this context as well.

Recommended Approach

In considering alternatives for calculating avoided capacity costs, the EWG reviewed avoided cost calculation practices in other states, consulted with Commission staff on applicable methods and data, and analyzed the likely impacts on existing Focus programs and measures. After considering all aspects of this review, the EWG recommended an avoided cost calculation method based on two MISO generated values:²

1. The costs of adding new peaking capacity – at present the cost of adding a new combustion turbine within MISO's territory.
2. The energy costs associated with operating and generating electricity with the new unit.

² Although these are referred to as MISO-generated values, as they are presented annually by MISO to the Federal Energy Regulatory Commission (FERC), in fact these values are generated on MISO's behalf by the Independent Market Monitor (IMM), presently Potomac Economics, Ltd.

The recommended source for the first component is the MISO-established value for the CONE. More specifically, EWG recommended the midpoint of the CONE values for MISO Local Resource Zones (LRZs) 1 and 2. The recommended source for estimating the energy costs of operating the new peaker is a weighted average of the net revenues presented in MISO's NCA Mitigation Thresholds Report to Federal Energy Regulatory Commission (FERC). Specifically, a weighted average of the net revenue values for the NCAs most relevant to Wisconsin:

1. Wisconsin-Upper Michigan System (WUMS),
2. North WUMS, and
3. SE Minnesota/N Iowa/SW Wisconsin.

The EWG recommends this approach based on its use of transparent, publicly available data that can be obtained at no cost, as well as its ability to calculate Wisconsin-specific avoided costs figures.

Analysis Criteria Considered

Consistent with other avoided cost values used to evaluate Focus, and to account for savings from long lasting measures that contribute to the lifecycle savings framework, any approach for calculating avoided electric capacity needs to provide a string of values extending 30 years into the future. To develop a recommendation for generating these values, the EWG analysis considered the following key characteristics.

- **Transparency.** As with natural gas and electricity avoided costs, price forecast results are heavily influenced by assumptions regarding future market conditions. The EWG preferred sources that favored transparency in verifying and assessing the assumptions used. Transparency allows the EWG to more effectively assess the relative merits of

different forecasts, develop methods to adjust forecasts where it believes appropriate, and analyze the causes of any differences between initial forecasts and outcomes.

- **Continuity.** The EWG sought approaches that use data from sources that have a longstanding history of availability and a high expectation for continued availability to allow for consistency in approach over multiple quadrenniums.
- **Cost.** In the interest of conserving program resources, the EWG preferred sources that are free or low-cost to access.
- **Flexibility.** The EWG preferred approaches that allow flexibility to accommodate changes in the definition of peak periods or to align with program priorities that may shift over time based on Commission or legislative guidance.

Analysis Overview

The EWG’s review of methods used in other states found that there are several approaches that are used in deriving avoided capacity costs. One source the EWG reviewed was the Environmental Protection Agency’s (EPA) National Action Plan for Energy Efficiency and its 2007 publication: Guide to Resource Planning with Energy Efficiency.³ This document presents an approach for developing an avoided cost that is inclusive of both the cost of a plant as well as the cost of generating electricity. In the section “Developing a Long-Term Forecast for Electricity” the document states:

The typical approach to developing a long-term forecast for electricity price is to use the Cost of New Entrant (CONE). In this approach, the avoided cost is set at the “all-in” cost of the next generation resource, which may be a new natural gas combined-cycle gas turbine, but possibly also a pulverized coal plant or integrated gasification combined cycle (IGCC) plant. The term “all-in” means both the costs of building the power plant (e.g. the

³ National Action Plan for Energy Efficiency (2007). Guide to Resource Planning with Energy Efficiency. Prepared by Snuller Price et al., Energy and Environmental Economics, Inc. www.epa.gov/eeactionplan. Retrieved February 24, 2020 from: https://www.epa.gov/sites/production/files/2015-08/documents/resource_planning.pdf

capacity costs) and the costs of generating electricity such as fuel, maintenance, and other costs (e.g. energy costs).

The approach of basing avoided capacity on CONE is used in neighboring Minnesota and Michigan as well. While there has been discussion around the transparency of the approach used by the Investor Owned Utilities (IOUs)⁴, the Minnesota Municipal Power Agency's (MMPA) Application For Integrated Resource Plan Approval 2019 – 2033⁵ states on page C-9:

The RES [Renewable Energy Standards] rate impact calculations include avoided energy, capacity, and emissions costs. There were no avoided transmission costs included in the rate impact. Historically, the avoided energy costs are those associated with MMPA's PPAs [Power Purchase Agreements] and owned assets. The projected avoided energy costs are based on locational marginal prices for Minnesota Hub, escalated at inflation. The avoided capacity costs are based on the MISO Zone 1 Cost of New Entry (CONE), escalated at inflation.

Additionally, on page 88 of the 2017 *Michigan Lower Peninsula Electric Energy Efficiency Potential Study*⁶, the authors cite the use of MISO CONE data in their scenario analysis.⁷

As recommended in the National Action Plan for Energy Efficiency, the EWG reviewed potential data sources that would allow the costs of generating electricity to be included as a component of the peaker plant costs. In its annual NCA Mitigation Thresholds submission to FERC,⁸ MISO defines the net revenues that it is presumed a new peaking generator would likely earn in an NCA. Avoided net revenues of a peaker plant are considered a benefit due to

⁴ See page 9 of the "Center For Energy And Environment's Comments In The Matter Of Conservation Improvement Program Electric Utilities – 2020–2022 Cost-Effectiveness Review," on Docket No. E999/CIP-18-783 ([Document ID: 20194-152112-02](#)).

⁵ DOCKET NO. ET-6133/RP-18-524 ([Document ID: 20187-145424-02](#)). Also available from: <https://mmpa.org/wp-content/uploads/2019/08/2018-MMPA-IRP-Final-PUBLIC.pdf>

⁶ https://www.michigan.gov/documents/mpsc/MI_Lower_Peninsula_EE_Potential_Study_Final_Report_08.11.17_598053_7.pdf

⁷ According to the document, the base-case scenarios used a forecast of electric avoided costs of energy and generation capacity were obtained from Consumers Energy and DTE Energy. The approaches used by Consumers and DTE Energy are not defined in this document, and therefore were not reviewed by the EWG.

⁸ NCA Mitigation Threshold, and other reports cited in this memo, are available in the "Independent Market Monitor" section of the MISO Website here: <https://www.misoenergy.org/markets-and-operations/independent-market-monitor2/>

increased energy efficiency displacing both the need to construct and operate a new peaker. As capacity constraints in the Wisconsin system become more likely within the planning horizon for – and the benefit calculation period of – Focus, the value of energy efficiency as an economical option for achieving demand savings has increased. Avoiding not only the cost of constructing a peaker plant, but also the operating costs, is a benefit for ratepayers that is unique to energy efficiency investments compared to renewable or distributed energy resources. Consequently, the EWG recommends an approach to calculate the avoided capacity cost to be used in evaluating Focus that includes the avoided net revenues for the peaker plant as calculated by MISO and reported in the NCA Mitigation Thresholds Report.

Escalation of Avoided Capacity Cost

While investigating alternatives for computing avoided capacity values, the EWG considered the appropriateness of continuing the current approach of using a static value for avoided capacity over the 30-year forecast horizon. A 2015 study by the American Council for an Energy-Efficient Economy (ACEEE) compared the values and sources of avoided costs and other cost effectiveness inputs used in evaluating energy efficiency programs around the country.⁹ Among the comparisons in the report is a comparison of the values used for avoided capacity by 16 utilities or jurisdictions. Of the 16 presented, only Wisconsin did not escalate the avoided capacity value. Escalating the avoided capacity value accounts for expected increases in construction and generation costs – which are a particular concern when these are expected to grow at a rate greater than inflation. As capacity constraints become more likely within the planning horizon for Focus, the EWG recognizes the importance of capturing forecast trends in

⁹ Baatz, Brendon. 2015. *Everyone Benefits: Practices and Recommendations for Utility System Benefits of Energy Efficiency*. Washington, DC: ACEEE. <http://aceee.org/researchreport/u1505>. Specifically, Appendix B (page 55) and Figure 7 on page 19.

setting avoided capacity cost values. Consequently, the EWG recommends that the value for avoided capacity be escalated, and that the escalation approach be based on approaches that align with the two components of the recommended avoided capacity value.

For the CONE value, in consideration of the fact that construction costs have been rising faster than inflation in Wisconsin, the EWG recommends using the Wisconsin Department of Transportation (WisDOT) Chained Fisher Construction Cost Index^{10,11}, less the Consumer Price Index (CPI) in the Midwest Region, as reported by the U.S. Bureau of Labor Statistics.¹²

For the NCA net revenue component, the EWG recommends escalating this value at a rate equivalent to the MISO Transmission Expansion Plan (MTEP) forecasted growth in the average Locational Marginal Price (LMP) for electricity across Wisconsin nodes (the source currently used for calculating electric avoided energy costs) during the peak period as defined for Focus— currently 1-4 pm on non-holiday weekdays from June through August.

Avoided Transmission and Distribution Costs

As a previous Commission decision opted to remove the avoided transmission and distribution costs from the EWG proposed avoided cost calculation ([PSC REF#: 215245](#)), the EWG is not recommending the inclusion of avoided transmission and distribution costs as a component of the avoided capacity cost at this time. However, the Commission may wish to direct the EWG to explore options for including avoided transmission and distribution costs as its own stream of benefits in the overall calculation of avoided costs and recommend an approach (see Commission alternatives below).

¹⁰ A description of the WisDOT Chained Fisher Construction Cost Index is available for download here: <https://wisconsin.gov/Documents/doing-business/eng-consultants/cnslt-rsrcs/tools/estimating/understanding-the-cci.pdf>

¹¹ Source materials are available here: <https://wisconsin.gov/Pages/doing-business/eng-consultants/cnslt-rsrcs/tools/estimating/est-guidance.aspx>

¹² Bureau of Labor Statistics Midwest CPI Summaries available here: <https://www.bls.gov/regions/midwest/cpi-summary/home.htm>

Detailed Avoided Capacity Cost Methodology

The step-by-step forecast methodology the Evaluation Contractor developed to determine the avoided electric capacity costs is outlined below. The EWG is recommending this methodology in compliance with the Commission's order that states, "For the purposes of evaluating Focus, avoided electric capacity costs shall be based on the unit costs of a peaker plant." ([PSC REF#: 343909](#).) This recommendation is limited to the context of Focus program evaluation, and is not intended as a recommendation for any other purposes outside of this scope without Commission consideration thereof.

Avoided Capacity Cost Calculation Steps

1. Take the average of MISO CONE values for Local Resource Zone (LRZ) 1 and LRZ 2, which encompass the territory of interest to Focus and the Commission. MISO publishes these values yearly.
2. Take the weighted average of the NCA net revenues, which are published yearly by MISO. The NCAs used in the calculation are WUMS, North WUMS and SE Minnesota. The weights are based on the node loads used in the electric avoided cost approach and are then associated with each NCA.
3. To account for forecasted yearly growth in prices, escalate the most recent weighted NCA value by MTEP peak prices for Wisconsin nodes. Peak prices are defined as non-holiday weekdays from 1 - 4 PM CT during June, July, and August. The yearly percentage change for future MISO MTEP peak prices are used as an escalation factor for 30 years.
4. To account for forecasted yearly growth in construction costs, escalate the most recent average CONE value by a growth factor that takes into account inflation and

construction costs. The growth factor is calculated by taking a 4-year average of construction cost growth as determined by WisDOT in the Chained Fisher Construction Cost Index, and subtracting inflation (U.S. Bureau of Labor Statistics Consumer Price Index, Midwest Region), over the same period. Use the growth factor to escalate over a 30-year period.

5. Add the CONE and NCA values for each year to develop a forecasted avoided cost estimate.

The final calculated values using the EWG's recommended approach are shown in the table on the following page:

Forecasted Avoided Electric Capacity Cost

Year	Avoided Electric Capacity Cost (\$/kW-Year)
2019	\$ 117.43
2020	\$ 124.75
2021	\$ 128.06
2022	\$ 131.38
2023	\$ 135.46
2024	\$ 139.56
2025	\$ 143.66
2026	\$ 147.76
2027	\$ 151.88
2028	\$ 154.64
2029	\$ 157.40
2030	\$ 160.18
2031	\$ 162.96
2032	\$ 165.75
2033	\$ 168.55
2034	\$ 171.35
2035	\$ 174.17
2036	\$ 176.99
2037	\$ 179.83
2038	\$ 182.67
2039	\$ 185.52
2040	\$ 188.38
2041	\$ 191.25
2042	\$ 194.12
2043	\$ 197.01
2044	\$ 199.90
2045	\$ 202.81
2046	\$ 205.72
2047	\$ 208.65
2048	\$ 211.58
2049	\$ 214.52
2050	\$ 217.48

Applying this approach results in a lower first year quadrennial value for avoided capacity, and a lower average avoided capacity cost over the Quad III four-year period, compared to the values used in previous quadrenniums. However, the escalation method results

in higher values relative to the static values used in previous quadrenniums beginning in 2022.

The reduction in the avoided capacity values for Quad III resulting from the recommended methodology appears consistent with trends in both natural gas prices and variability in the CONE that has occurred in the years since the previous value was calculated for Quad II.

Recommendation

The EWG recommends that Focus calculate avoided capacity costs for the Quad III period using the average of the most recent MISO CONE values for LRZ 1 and LRZ 2 plus a weighted average of the net revenues estimates from the MISO NCA Mitigation Threshold Report. The EWG intends to monitor and assess this approach over the remainder of the Quad to assess the volatility in the escalation rate/forecasted values relative to the market. The EWG will also to monitor the appropriateness of the approach in reflecting both the benefits generated by the program and the priorities for Focus on Energy as established by the Commission.

In order to avoid dramatic swings from one quadrennium to the next, and to ensure that the benefits calculated as part of the evaluation of Focus on Energy do not get out of alignment with market realities, trends, and forecasts, the EWG recommends that the Evaluation Contractor review avoided cost values annually. The findings from each annual review are to be presented to the EWG. The EWG may, at its discretion, recommend to the Commission that an update to the avoided costs be considered more frequently than once per quadrennium.

Based upon previous decisions, the EWG has not recommended any costs, or basis for calculating costs, for avoided transmission and distribution. The EWG recommends that the Commission consider including a value for avoided transmission and distribution to be used only for the purposes of evaluating the benefits of Focus on Energy.

Commission Alternatives - Methodology

Alternative One: Approve the EWG's recommendation that Focus calculate avoided capacity costs for the Quad III period using the average of the most recent MISO CONE values for LRZ 1 and LRZ 2 plus a weighted average of the net revenues estimates from the MISO NCA Mitigation Threshold Report.

Alternative Two: Approve the EWG's recommendation with modifications.

Alternative Three: Do not approve the EWG's recommendation and direct the EWG to propose a different methodology.

Commission Alternatives – Cycle for Reviewing Avoided Costs

Alternative One: Approve the EWG's recommendation that the Evaluation Contractor review avoided cost values annually..

Alternative Two: Approve the EWG's recommendation with modification.

Alternative Three: Decline and maintain once per quadrennium update process.

Commission Alternatives - Avoided Transmission and Distribution

Alternative One: Approve the EWG's recommendation and direct the EWG to propose a method for calculating the avoided transmission and distribution costs.

Alternative Two: Do not approve the EWG's recommendation and continue to evaluate Focus on Energy without including a value for avoided transmission and distribution costs.

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